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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/726,663	11/30/2000	Chrong-Jung Lin	TS98-338B	1676
28112	7590	12/15/2003	EXAMINER	
GEORGE O. SAILE & ASSOCIATES 28 DAVIS AVENUE POUGHKEEPSIE, NY 12603			DICKY, THOMAS L	
			ART UNIT	PAPER NUMBER

2826

DATE MAILED: 12/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

11C

Office Action Summary

Application No. 09/726,663		Applicant(s) LIN ET AL.	
Examiner Thomas L Dickey		Art Unit 2826	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5 and 6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5 and 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 31 July 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9 September 2003 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1,2,5, and 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims all require that the top surface comprise more than five (5) individually connected top surfaces defined by multiple

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regions of individual cross-sectional shapes, thus excluding top surfaces comprising one, two, three, four, or five individually connected top surfaces. The application as filed discloses that applicants considered their invention to include any number of individually connected top surfaces, so long as that number exceeds one. Note application, page 14, line 19, through page 15, line 4. Applicants are not free now to set an arbitrary minimum number of individually connected top surfaces unless that number was disclosed in the application as filed. The only minimum number of individually connected top surfaces disclosed, in the application as filed, was two.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Nishihara (5,854,502).

Nishihara discloses a stacked-gate flash memory cell comprising a semiconductor substrate 1 having an active area (seen directly below thin gate oxide film region 17), a floating Poly-Si gate 25 with a bottom surface and a multiply connected top surface, the bottom surface being flat and overlying the active area, the multiply connected top surface overlying the bottom surface; the multiply connected top surface being defined

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by multiple regions of individual cross-sectional shapes, wherein the area of the multiply connected top surface overlying the active area is greater than the area of the bottom surface, wherein the individual cross-sectional shapes are selected from a group consisting of rectangular, trapezoidal and triangular shapes (in this case, rectangular or triangular), said multiply connected top surface comprising nine (9) individually connected top surfaces, which is more than five (5) individually connected top surfaces defined by said multiple regions of individual cross-sectional shapes, a conformal inter-poly dielectric layer 27 replicating the individual cross-sectional shapes over the floating Poly-Si gate 25; and a conformal Poly-Si control gate 26 replicating the individual cross-sectional shapes over the inter-poly dielectric layer 27. Note figure 7B and column 5 lines 34-54 of Nishihara.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2,5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishihara (5,859,454) in view of MURAI (5,243,559).

Nishihara discloses a stacked-gate flash memory cell with all the limitations of claims 2,5, and 6 except certain specific dimensions for the thickness of the floating gate (190-210 nm), an ONO inter-poly dielectric layer (15-25 nm), and control gate (150-200 nm)

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Note figure 6 of Nishihara. Nishihara is silent on whether the interpoly layer should be made of and the question of what the floating gate, control gate, and interpoly layer dimensions should be. However, Murai, which was published well before Nishihara was applied for, and would have been well known to Nishihara, discloses a stacked-gate flash memory cell with a floating gate 36 having a thickness in the range of 190-210 nm, an ONO inter-poly dielectric layer 37 having a thickness in the range of 15-25 nm, and a control gate 38 having a thickness in the range of 150-200 nm. Note column 4 lines 37, 43, and 50 of Murai. Therefore, it would have been obvious to a person having skill in the art to build a physical realization of Nishihara's stacked-gate flash memory cell using the dimensions taught by Murai in order to build Nishihara's stacked-gate flash memory cell with a minimum of experimentation. In the absence of specific instructions from Nishihara one having skill in the art would reasonably believe that any dimensions known to Nishihara (such as the Murai dimensions) would work.

Response to Arguments

5. Applicant's arguments filed 12/30/02 with respect to claims 1-6 have been considered but are moot in view of the new ground(s) of rejection. With regard to the new art it should be noted that Nishihara meets the claims by disclosing a floating gate having, inter alia, a flat bottom, but Nishihara does not disclose a floating gate whose bottom is entirely flat, as shown in applicant's figures 2h-2l.

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Allowable Subject Matter

6. Claim 3 is allowed over the references of record because none of these references disclosed or can be combined to yield the claimed invention such as a stacked-gate flash memory cell having a floating Poly-Si gate with multiply connected surfaces of individual shapes comprising: a semiconductor substrate having an active area; a floating Poly-Si gate with a bottom surface and a multiply connected top surface; said bottom surface being flat and overlying said active area; said multiply connected top surface overlying said bottom surface; said multiply connected top surface being defined by multiple regions of individual cross-sectional shapes, wherein the area of said multiply connected top surface overlying said active area is greater than the area of said bottom surface; wherein said individual cross-sectional shapes are selected from a group consisting of rectangular, trapezoidal and triangular shapes; a conformal inter-poly dielectric layer replicating said individual cross-sectional shapes over said floating Poly-Si gate; and a conformal Poly-Si control gate replicating said said individual cross-sectional shapes over said inter-poly dielectric layer, wherein said regions of individual cross-sectional shapes have a depth between about 900 to 1000 Å.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. The examiner can normally be reached on Mon-Thu 8-6. Any inquiry concerning


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this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. After February 4, 2004, this telephone number will change to (571) 272-1913. The examiner can normally be reached on Tues-Friday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TLD
12/2003


Minhloan Tran
Primary Examiner
Art Unit 2826